



I&T Update NSTX-U / Magnetic Fusion Science Meeting

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Sept. 17 2018



I&T Programs Update

- International PMI
 - Highlight: J.K. Park *Nature Phys.* article
 - Experiments on EAST in PMI area in Aug: confirmed that Li granule dropper eliminated ELMs, similar to Li powder; and exposed third generation liquid Li limiter (made of Mo) to H-mode with $P_{\text{aux}} \sim 6$ MW
 - Teams participating in AUG with B powder 10/4-10/12 and KSTAR long pulse with B powder 10/29-11/2
 - Powder injector on W7-X and error field studies on COMPASS
- International long pulse – dedicated slide
- DIII-D – see dedicated slides



W7-X probe mounted powder injector (PMPI)

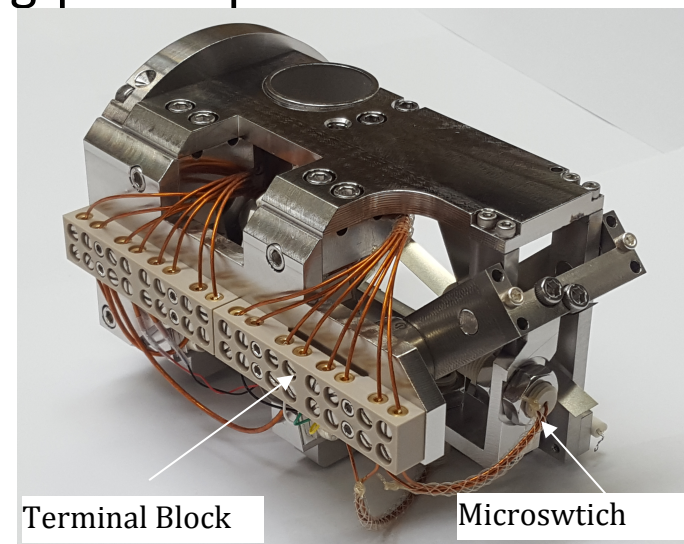
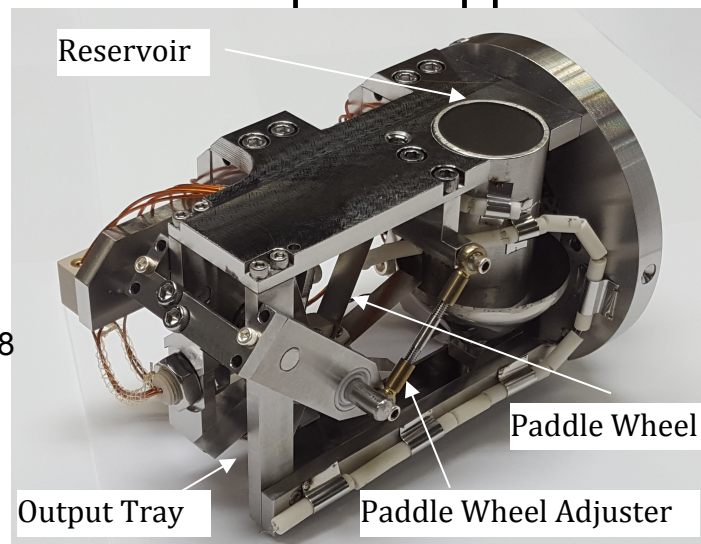
- PPPL has developed new powder delivery system capable of horizontal powder injection
- Developed for use on W7-X for ease of installation on their Multi-Purpose Manipulator
- This proof-of-principle device will be used to test possibility of steady state boronization with multiple droppers for long-pulse operation

Experiments
planned in ~
2 weeks

A. Nagy et al., SOFT 2018

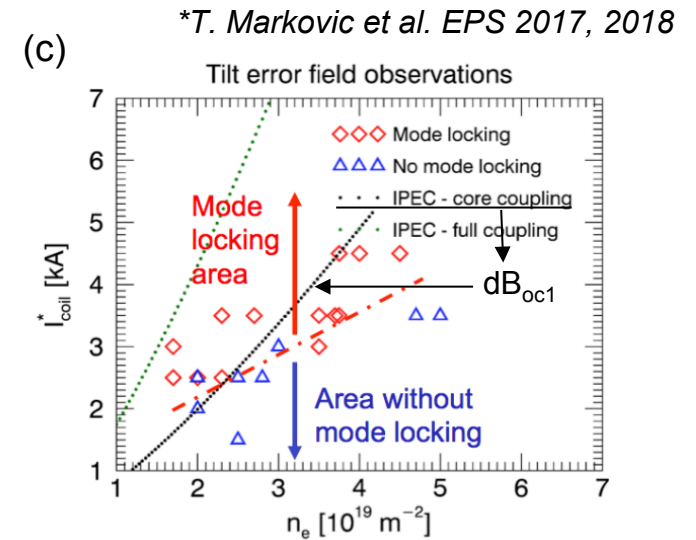
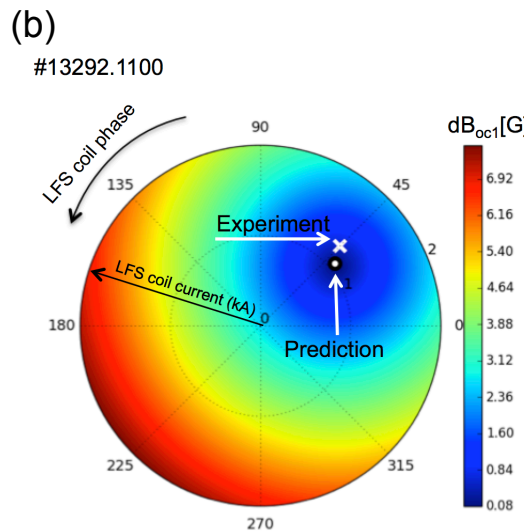
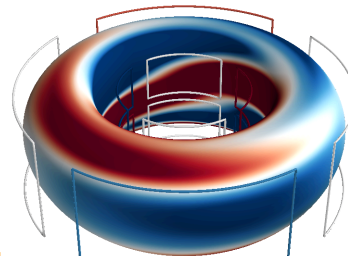
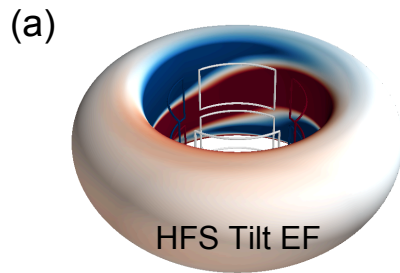
R. Lunsford, D. Gates

 17 Sep. 2018



GPEC analysis using resonant coupling metric predicted effective LFS correction in COMPASS

- Early concerns that HFS error field would be difficult to correct with LFS coils
- COMPASS experiments demonstrated avoidance of disruptive $n=1$ locked modes by LFS correction*
 - (a) despite increase of total 3D fields (b) optimal correction is predictable by IPEC overlap field (δB_{oc1} , ITER physics bases) and (c) linear density correlation of EF thresholds
 - Validated the GPEC prediction



1 HFS Tilt EF + LFS correction

NSTX-U Physics Meeting

J.K. Park



International Long Pulse – F. Poli

- KSTAR: focus on TRANSP modeling (EP physics) and Fusion Flight Simulator
 - streamline submission of TRANSP simulations
 - Working with KSTAR team to select cases for analysis and projection (M. Podesta)
 - TRANSP-Simulink, good progress on in-memory data transfer
 - Good progress on NUBEAM-NN for KSTAR
- EAST: focus on modeling LHCD for optimization of long-pulse operation (W. Choi)
 - Working on a procedure to minimize data uncertainties on simulations (analytic profiles)
 - Next: work on implementing a reduced SOL model in GENRAY/CQL3D and TRANSP
- JET: focus on modeling of the baseline (A. Teplukhina) and hybrid (F. Poli)
 - Streamline preparation of data for TRANSP (consistent mapping is a problem)
 - Leverage Faraday cups diagnostics for physics studies (M. Podesta)
 - RF-NBI synergy, validation and model improvement in TRANSP (N. Bertelli)



DIII-D Contributions to NSTX-U / Magnetic Fusion Science Meeting

B.A. Grierson

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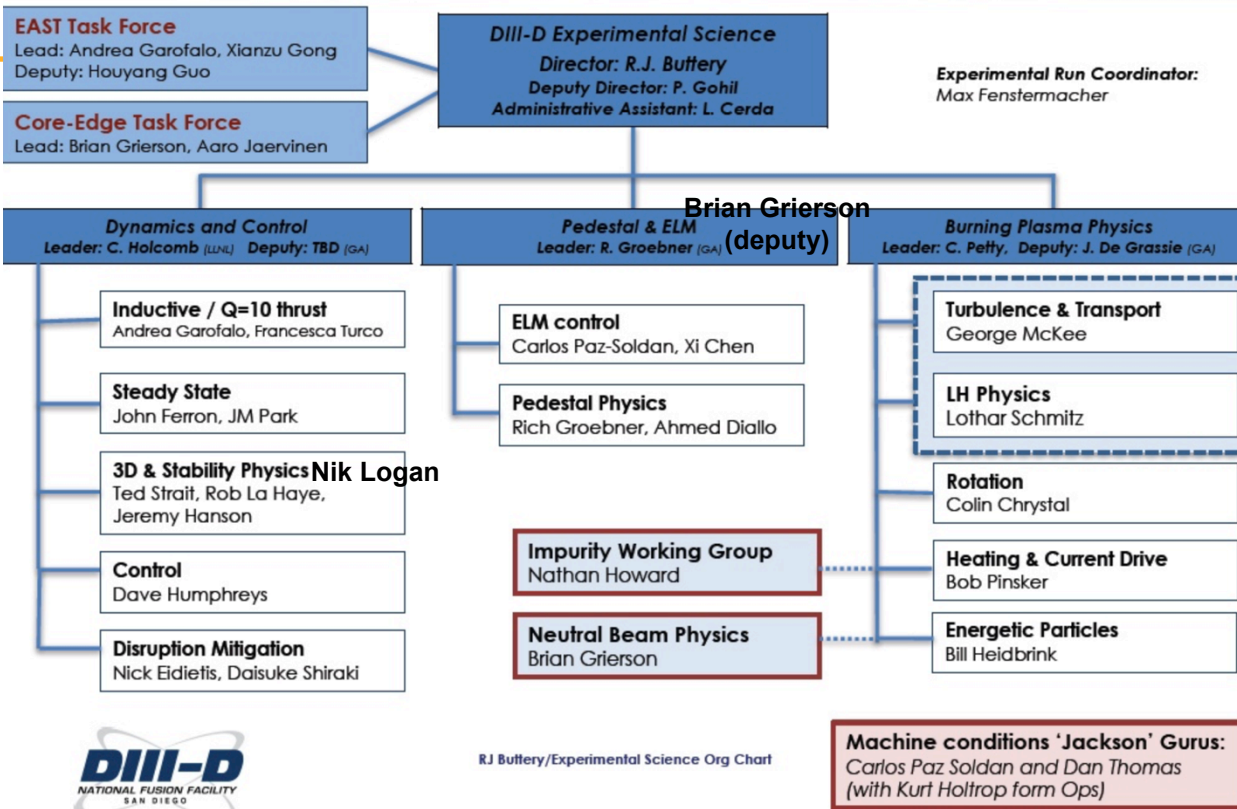


DIII-D: New leadership roles for PPPL

- Nik Logan to Take on role as 3D & Stability Physics Leader for FY19-20 Program
 - Charged with overseeing our strategy for stability integrated disruption avoidance
- Brian Grierson to Take on Role as Pedestal and ELM Deputy Group Leader
 - Brian will retain his role as co-leader of core-edge integration task force



DIII-D Scientific Organization of Experimental Science Division



RJ Buttery/Experimental Science Org Chart



Upcoming DIII-D Research Planning

- Strategic Planning Workshops in Dec.
- ROF Planning and Breakouts in Jan.
- ROF early Feb.
- Start of Physics in May

